

Quiz #3

1. A competitive market has market demand curve $Q = 144 - 6p$. It is composed of identical firms, each with cost function $c(q) = 36 + q^2$ (so that marginal cost is $c'(q) = 2q$).

a. **(15 points)** Suppose initially the price is \$8, and there are 24 firms in the market. Calculate how much each firm will produce at this price, and how much profit each firm will make.

b. **(10 points)** What will happen to the number of firms in the market in the long run?

c. **(15 points)** Solve for the long-run price and quantity in this market. How many firms are in the market in the long run?

2. **(20 points)** Suppose the price elasticity of supply for cigarettes is 1, while the price elasticity of demand is -0.8 . Suppose also that the price elasticity of supply for restaurant meals is 1, while the price elasticity of demand is -1.2 . Lexington is considering taxing either cigarettes or restaurant meals; which of these two possibilities would lead to a smaller deadweight loss, and why?

3. Suppose demand is given by $p = 200 - 3q$, while supply is given by $p = 2q$.

a. **(5 points)** Calculate consumer and producer surplus in equilibrium.

b. **(15 points)** Suppose the government imposes a tax of \$20 on sellers. Calculate consumer and producer surplus, government revenue, and the deadweight loss of the tax.

4. Caliban allocates \$240 to clothes (C) and food (F). He has utility function $u(C, F) = CF^3$ (so that $MU_C = F^3$ and $MU_F = 3CF^2$). The price of clothing is p_C , while the price of food is p_F .

a. **(15 points)** Derive Caliban's demand function for food.

b. **(5 points)** How much food does Caliban consume if $p_f = \$6$ and $p_c = \$15$? What if $p_f = \$12$ and $p_c = \$22$?